

CLAIMS

- RECEIVED
APR 20 1987
U.S. PATENT AND TRADEMARK OFFICE
5
1. An electronic component to be mounted on a printed board, characterized by comprising:
- a plurality of electrical connecting portions provided on an electrical connecting surface of the electronic component and the printed board; and a reference mark that serves as a reference of arrangement positions of the electrical connecting portions.
2. An electronic component as claimed in claim 1, characterized in that the reference mark of the electronic component is provided on the electrical connecting surface side facing a mounting position on the printed board.
3. An electronic component as claimed in claim 1, characterized in that the reference mark of the electronic component is provided on the opposite side of the electrical connecting surface that faces the mounting position on the printed board.
- 20 4. An electronic component as claimed in claim 2 or 3, characterized in that the reference mark of the electronic component is a projection peculiar to the electronic component, or a print.
5. An electronic component as claimed in claim 2 or 3, characterized in that the reference mark of the electronic component includes at least one reference mark obtained by coding information concerned with the electronic component.

6. An electronic component as claimed in claim 5, characterized in that the information of the reference mark is discrimination information of the electronic component expressed by a two-dimensional bar code.

7. An electronic component as claimed in claim 5,
characterized in that the information of the reference mark
is information concerned with a state in which the
electrical connecting portions are formed.

8. An electronic component as claimed in any one of claims 1 through 7, wherein the reference mark is located in a corner portion of the electronic component.

9. An electronic component as claimed in any one of claims 1 through 8, wherein the reference mark is formed on the electronic component simultaneously with the electrical connecting portions.

10. An electronic component as claimed in any one of claims 1 through 9, wherein the electrical connecting portions are solder bumps.

11. An electronic component as claimed in any one of claims 1 through 9, wherein the electrical connecting portions are lands.

12. An electronic component mounting method for taking out an electronic component from a component supply section and mounting the electronic component in a mounting position on a printed board, characterized by comprising:

a recognizing process for recognizing a reference mark that is provided on the electronic component to be

mounted and serves as a reference of arrangement positions of electrical connecting portions provided on an electrical connecting surface of the electronic component and the printed board; and

5 a quality checking or correcting process for executing quality check of the electronic component or executing positional correction in a mounting stage according to a result of recognition,

10 whereby the mounting of the electronic component that has passed through the quality checking or correcting process is executed.

13. An electronic component mounting method for taking out an electronic component from a component supply section and mounting the electronic component in a mounting position on a printed board, characterized by comprising:

15 a first recognizing process for recognizing a reference mark that is provided on the electronic component to be mounted and serves as a reference of arrangement positions of electrical connecting portions provided on an electrical connecting surface of the electronic component and the printed board;

20 a second recognizing process for recognizing a recognition mark of a target mounting position on the printed board; and

25 a quality checking and correcting process for executing quality check of the electronic component and executing positional correction in a mounting stage

100
90
80
70
60
50
40
30
20
10
0

according to results of recognition of the first recognizing process and the second recognizing process,

whereby the mounting of the electronic component that has passed through the quality checking and correcting process is executed.

14. An electronic component mounting method as claimed in claim 12 or 13, characterized in that the quality check of the electronic component to be mounted includes a component inspecting process for checking the electronic component by a state of formation of the electrical connecting portions recognized based on a relative position with respect to the reference mark of the electronic component.

15. An electronic component mounting method as claimed in any one of claims 12 through 14, wherein at least one of a plurality of recognition marks of the target mounting position on the printed board is discrimination information of the electronic component to be mounted, the information being expressed by a two-dimensional bar code obtained by coding information.

16. An electronic component mounting method as claimed in any one of claims 12 through 15, wherein the reference mark of the electronic component includes at least one reference mark obtained by coding information concerned with the state of formation of the electrical connecting portions, and the electronic component that is determined to be defective through the quality checking process is processed

00000000000000000000000000000000

20

25

on the basis of the information of the reference mark concerned with the state of formation of the electrical connecting portions.

17. An electronic component mounting method as claimed in any one of claims 12 through 14, wherein the reference mark is formed on the electronic component simultaneously with the electrical connecting portions.

5 18. An electronic component mounting method as claimed in any one of claims 12 through 17, wherein the electrical connecting portions are solder bumps.

19. An electronic component mounting method as claimed in any one of claims 12 through 17, wherein the electrical connecting portions are lands.

20. An electronic component mounting apparatus characterized by comprising:

a component supply section of the electronic component claimed in any one of claims 1 through 11;

a mounting head for moving the electronic component from the component supply section to a mounting position and mounting the electronic component on the printed board;

20 a mounting table on which the printed board to be mounted with the electronic component is placed;

25 a component inspecting section for recognizing the reference mark of the electronic component to be mounted; and

a control section for executing quality check or

090716200150

positional correction in a mounting stage of the electronic component according to a result of recognition.

21. An electronic component mounting apparatus characterized by comprising:

5 a component supply section of the electronic component claimed in any one of claims 1 through 11;

a mounting head for moving the electronic component from the component supply section to a mounting position and mounting the electronic component on the printed board;

a mounting table on which the printed board to be mounted with the electronic component is placed;

a component inspecting section for recognizing the reference mark of the electronic component to be mounted;

a board recognizing section for recognizing a recognition mark of the mounting position of the printed board; and

20 a control section for executing quality check or positional correction in a mounting stage of the electronic component according to a result of recognition.

22. An electronic component mounting apparatus as claimed in claim 20 or 21, characterized in that the reference mark obtained by coding information provided for the electronic component to be mounted is recognized by using either the component inspecting section that recognizes the reference mark provided for the electronic component or the recognizing section that recognizes the

0500220500

recognition mark of the target mounting position on the printed board.

23. An electronic component mounting apparatus as claimed in any one of claims 20 through 22, wherein the reference mark is formed on the electronic component simultaneously with the electrical connecting portions.

5 24. An electronic component mounting apparatus as claimed in any one of claims 20 through 23, wherein the electrical connecting portions are solder bumps.

25. An electronic component mounting apparatus as claimed in any one of claims 20 through 23, wherein the electrical connecting portions are lands.

Insert A7D

CONTINUED ON PAGE